

March 25, 1886.

Professor STOKES, D.C.L., President, in the Chair.

The presents received were laid on the table, and thanks ordered for them.

The following Papers were read:—

- I. "Abstract of Paper upon the Minute Anatomy of the Brachial Plexus." By W. P. HERRINGHAM, M.B., M.R.C.P., Communicated by W. S. SAVORY, F.R.S. Received March 8, 1886.

The paper is based upon 55 dissections, 32 foetal and 23 adult.

The *posterior thoracic* is formed by the 5th, 6th, and usually the 7th. The 5th supplies the first two digitations, the 6th the next two, the 6th and 7th the lower five, or if there is no 7th, the 5th may supply three, and join the 6th for the remainder.

The *suprascapular* is given off from the 5th, with or without a minute fibre from the 6th.

The *anterior thoracics* are formed usually by the 6th, the 7th, the 8th, and the 9th. The 6th and 7th form the external, supplying the upper part of the pectoralis major, the 7th gives the communicating branch which supplies the middle, and the union of this with the internal from the 8th and 9th, supplies the lower part of the muscle. The minor is supplied by the 7th, 8th, and 9th.

The *coraco brachialis* is supplied by the 7th.

The rest of the *musculo cutaneous* is formed by the 5th and 6th. Both nerves enter the biceps and brachialis anticus. The cutaneous branch is mostly from the 6th, slightly also from the 5th.

The *median* is formed by the 6th, 7th, 8th, and 9th.

The 6th supplies the pronator teres, flexor carpi radialis, superficial thenar muscles, and radial finger, or fingers.

The 7th supplies the flexor sublimis, occasionally the anterior interosseous, the palmar cutaneous, and the finger next the 6th.

The 8th supplies the flexor sublimis, the anterior interosseous, and the fingers inside the 7th.

The 9th supplies the anterior interosseous, and usually ends there.

The *ulnar* is formed by the 8th and 9th; the muscles in the forearm are supplied by both, those in the hand by the 8th. The 9th supplies the cutaneous branches in front, the 8th the dorsal branch.

The *internal* and *lesser internal cutaneous* are usually supplied by the 9th, the former occasionally by the 8th as well.

The posterior branches :—

The *subscapularis* is supplied by branches from the 5th and 6th only ; the *teres major* by the 6th, often with a twig from the 7th ; the *latissimus dorsi* by the 7th, often with a twig from the 8th.

The *circumflex* is formed by the 5th and 6th. The latter is not traced to the *teres minor*. Both go to the deltoid. The cutaneous branch is formed by the 5th alone, or by both.

The *musculospiral* is formed by the 6th, 7th, and 8th ; sometimes the 5th, and rarely the 9th, send branches to it.

The *triceps* is supplied by the 7th and 8th. The long head usually by the 8th, the inner head by the 7th and 8th, and the outer by the 7th. The 6th sometimes runs to the outer head.

The *internal cutaneous* branch comes from the 8th. The short *external cutaneous* springs from the 6th, the long varies round the 7th. The *brachialis anticus*, *supinator longus*, and *supinator brevis* are supplied by the 6th.

The *extensor carpi radialis longior* and *brevior* are supplied by the 6th or 7th, usually the latter.

The *radial* is supplied by the 6th alone, or by the 6th and 7th.

The posterior *interosseous* is usually from the 7th alone, sometimes with aid from the 8th.

The nerves, both sensory and motor, are shown to obey the following law :—

- I. *Any given fibre may alter its position relative to the vertebral column, but will maintain its position relative to other fibres.*

An exceptional case is detailed in exemplifying this law.

The muscles are classed in a table, according to their motor nerve supply.

The system of the motor supply appears to be not according to use, but according to position, morphological not functional, and obeys the following law, composed of three rules :—

- II. A. *Of two muscles, or of two parts of a muscle, that which is nearer the head end of the body tends to be supplied by the higher, that which is nearer the tail end by the lower nerve.*
- B. *Of two muscles, that which is nearer the long axis of the body tends to be supplied by the higher, that which is nearer the periphery by the lower nerve.*
- C. *Of two muscles, that which is nearer the surface tends to be supplied by the higher, that which is further from it by the lower nerve.*

These rules are applied in detail.

The system of the sensory supply is examined in detail. It is shown to follow a law composed of two rules :—

III. A. *Of two spots on the skin, that which is nearer the preaxial border tends to be supplied by the higher nerve.*

B. *Of two spots in the preaxial area, the lower tends to be supplied by the lower nerve, and of two spots in the postaxial area, the lower tends to be supplied by the higher nerve.*

It is shown that this is the case with all membranes stretched into a sheath by something pushing out into them, and the epiblastic layer of the epidermis is compared to such a membrane, pushed into a tubal sheath by the developing mesoblast.

A note is added showing that other observers have reached similar results by other methods, and notably that Forgue has formulated laws for the motor nerves of the monkey, identical with those laid down in the present paper.

II. "On the Changes produced by Magnetisation in the Length of Iron Wires under Tension." By SHELFORD BIDWELL, M.A., LL.B. Communicated by Professor F. GUTHRIE, F.R.S. Received March 10, 1886.

In a paper communicated to the Royal Society about a year ago,\* I discussed the results of certain experiments made by Joule in relation to "the Effects of Magnetism upon the dimensions of Iron and Steel Bars."†

It is well known that the length of an iron rod is in general slightly increased by magnetisation. Joule enunciated the law that the elongation is proportional in a given bar to the square of the magnetic intensity, and that it ceases to increase after the iron is fully saturated.‡ My own experiments, made with a greater range of magnetising forces and with thinner rods than those used by Joule, show that if the magnetising current is gradually increased after the so-called saturation point of the iron has been reached, the elongation, instead of remaining at a maximum, is diminished, until when the current has attained a certain strength, the original length of the rod is unaltered, and if this strength be exceeded, actual *retraction* is produced.

Joule also found that when the experiment was performed upon an iron wire stretched by a weight, the magnetic extension was in all

\* "On the Changes produced by Magnetisation in the Length of Rods of Iron, Steel, and Nickel." "Proc. Roy. Soc.," vol. 40, p. 109.

† "Phil. Mag." [3], vol. xxx, pp. 76, 225, and the Phys. Soc.'s Reprint of Joule's Scientific Papers, p. 235.

‡ Reprint, pp. 245, 255.